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AUTHOR DeVries, David L.; And Others
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ABSTRACT

While many school systems are desegregating by altering the racial composition of their schools, fear, mistrust, and a lack of understanding characterize interactions among many students of different racial backgrounds. Recent research suggests that multi-racial cooperative student teams represent one way of improving race relations. The results of four field experiments with one classroom team structure, Teams-Games-Tournament (TGT), in racially integrated classrooms are reviewed. A consistent pattern of positive impact of TGT on both the number and percentage of cross-race relations is noted. The results provide additional support for the use of student teams to increase racial integration in classrooms. (Author)

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Biracial Learning Teams and Race Relations in the Classroom: Four Field Experiments on Teams-Games-Tournament

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David L. DeVries

Center for Creative Leadership
Greensboro, NC

Keith J. Edwards

Rosemead Graduate School of Psychology

Robert E. Slavin

Johns Hopkins University

May 27, 1977

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Biracial Learning Teams and Race Relations in the Classroom: Four Field Experiments on Teams-Games-Tournament[1]

May 27, 1977

Abstract

While many school systems are desegregating by altering the racial composition of their schools, fear, mistrust, and a lack of understanding characterize interactions among many students of different racial backgrounds. Recent research suggests that multi-racial cooperative student teams represent one way of improving race relations. The results of four field experiments with one classroom team structure, Teams-Games-Tournament (TGT), in racially integrated classrooms are reviewed. A consistent pattern of positive impact of TGT on both the number and percentage of cross-race relations is noted. The results provide additional support for the use of student teams to increase racial integration in classrooms.

In 1954 the Brown vs. Board of Education ruling initiated one of the most important social movements of our time -- the legal desegregation of our nation's schools. While the racial composition of classrooms has changed, social integration of minority groups remains minimal (Dorr, 1972; Gerard and Miller, 1975). Clearly increased interracial contact may be a necessary but is certainly not a sufficient condition to creating more harmonious race relations.

Reviews of the race relations literature (Amir, 1969; Pettigrew, Unseem, Normand and Smith, 1973) have generated reasons why merely creating desegregated classrooms is not sufficient for improving race relations among students. One important condition cited by the reviewers for constructive race relations is the creation of interdependencies among students from various racial groups. One way to structure such interdependencies in the classroom is by creating multiracial student work groups (or teams) in which all teammates share rewards.

The use of multiracial student teams as a tool for improving race relations is not new. Allport (1954) suggested that if students of different races were assigned to cooperative learning teams, they would learn to like and help one another. This expectation is supported by a long tradition of research indicating that persons placed in a cooperative reward structure, in which each group member's efforts help the group to be rewarded, come to like and help one another more than do members of groups that are not rewarded based on group performance. This effect is observed regardless of whether groups are rewarded based on their own performance alone or whether groups are in competition with

other groups (see Johnson and Johnson (1974) or Slavin (in press) for reviews). If this principle is true in general, it should especially apply in a setting in which liking must take place over an important interpersonal barrier, such as race.

As logical as this principle appears, only recently have researchers examined the impact of cooperative learning teams in classrooms on cross-racial friendship and helping. Aronson, Blaney, Sikes, Stephan, and Snapp (1975) used a system called "Jigsaw Teaching" for this purpose in several elementary classrooms in Austin, Texas. They found positive effects on liking of others across race lines for mixed groups of blacks, Chicanos, and Anglos. Weigel, Wiser, and Cook (1975) used a more general team technique and found increased cross-ethnic helping behavior in mixed black, Chicano, and Anglo secondary classes in Denver. Slavin (Note 1) used a technique called Student-Teams-Achievement Divisions to increase cross-racial liking and helping in a Baltimore junior high. These studies varied considerably in methodology, but all contained the essential element: multi-ethnic, cooperative teams interacting for extended periods (at least six weeks) on learning tasks, and being rewarded as teams for their group product.

The present paper reports the results of four studies evaluating the effects of a fourth team technique on cross-racial liking and helping. This technique is called "Teams-Games-Tournament," or TGT. TGT is unique among the techniques used to improve cross-racial perceptions for several reasons. First, it is the most extensively researched. Second, it is the only team technique now available for which impact on academic

achievement as well as effects on cross-racial attitudes have been reported. DeVries and Slavin (Note 2) review ten field experimental studies on TGT, seven of which show significant TGT effects on academic achievement in such areas as mathematics, language arts, and reading. Lucker, Rosenfield, Sikes, and Aronson (1976) show achievement effects for blacks and Chicanos only, and Slavin (Note 3) shows effects for blacks only.

The essential features of TGT are student teams and academic game tournaments. The teams are composed of 4-5 students: a high achiever, a low achiever, and 2-3 average achievers. Teams are also mixed with respect to sex and race. Teammates study together to learn academic material. At least once each week, the members of each team compete with members of other teams on simple academic games to gain points for their team. This competition, the game tournament, takes place between students of equal past achievement. In this way, each student has an approximately equal and substantial chance to contribute the maximum score to his or her team. A weekly newsletter announces team standings and recognizes students who have contributed outstandingly to their team scores. A more complete description of TGT is available in Fennessey, DeVries, and Edwards (Note 4).

The present paper reviews four studies which, as a whole, represent a wide ranging test of TGT's impact on race relations. The studies varied (1) the experimental design, (2) demographic characteristics of the student populations, (3) length of intervention, (4) measures of race relations.

Method

The four field experiments were conducted in a wide variety of school settings. Table 1 summarizes the settings for the four field experiments by describing the geographical area, grade(s), subject area(s), length of study, number of participants, and percentage of participants who were black. As indicated, the experiments differed on: geographical area (east coast and southeast United States), grade (seventh through twelfth), subject areas (mathematics, social studies, science, and English), and percent of black students (ranging from 10% to 51%). The experiments test the possible effect of TGT in widely divergent classroom settings. Also worthy of note is the relatively long implementation period for three of the four studies (9-12 weeks). The fourth study was in effect for four weeks.

Insert Table 1 and 2 About Here

Table 2 describes design characteristics of the four field experiments by examining (1) treatment groups, (2) level of random assignment, (3) measurement schedule of dependent variables, and (4) sociometric dimensions measured. For Experiment I, intact classes were used, with random assignment to treatment group occurring at the classroom level. The design involved a simple two-group comparison: TGT vs. a traditional Control group. The TGT treatment placed students on four-member, racially mixed teams. Each team competed against other teams on simple instructional games which were played in twice weekly tournaments. The Control classes were characterized by individual competition between students on traditional quizzes. The measure of race

relations (a sociometric questionnaire) was administered both before and after treatment, and involved asking the students to list the names of classmates (1) whom they considered their friends in school, and (2) who had helped them with their classwork. Each student's response to each item was coded for (1) the number of cross-race choices and (2) the number of within-race choices.

Experiment II involved stratified-random assignment of individual students to treatment groups. Stratification was based on achievement level, race and sex. The experimental design included three treatment groups: a standard TGT treatment involving cooperation within teams and competition across teams; a TGT-Cooperative treatment emphasizing the within-team cooperation component; and a traditional Control group. Sociometric items were administered, but only as a posttest. Students were asked to select classmates for each of the following dimensions: best friends, friends outside of school, friends in school, would work with/go to for help, and helped you. The sociometric items were designed to vary systematically on a social distance scale, for both the task (helping) and friendship dimensions. As in Experiment I, the number of cross-race and number of within-race choices made by each student were calculated for each sociometric item.

Experiment III used intact classes, with classes randomly assigned to treatment conditions. The design involved a simple two-group comparison, TGT vs. a traditional Control group. The sociometric measures were administered both before and after treatment. The following dimensions were assessed: friends outside school, friends in school, who would you work with or go to for help, and who has helped you. As in

Experiment II, the sociometric items measure relationships ranging from intimate to casual.

In Experiment III, the classes consisted of only about 10% black students. Therefore only the cross-race and within-race choices received by the black students were analyzed. Including all the white students in the analysis would have introduced a large quantity of within-race choices which would have obscured possible changes in social integration experienced by the black students.

Experiment IV, previously reported by DeVries and Edwards (1974), involved a 2 x 2 factorial design in which the factors were task (quiz vs. game) and reward (team vs. individual). The game-team treatment was identical to TGT. This study involved students randomly assigned to treatments, and rotated teachers across treatments to control for teacher effects. The classes contained 43% blacks. Sociometric measures administered (on a posttest basis) were friends in school, and who has helped you.

In interpreting the data from the four experiments, it is important to note that none of the participating teachers were aware of the hypothesis concerning TGT effects on race relations. All four experiments were considered by both participating teachers and the experimenters to be focused on major learning and additudinal outcomes. In fact, the main question was whether TGT could create greater student performance on standard academic tasks. Although a variety of demand characteristics can produce confounded results in any social psychological experiment (Orne, 1962), the four reported in this article appear to be relatively

free of such confounding factors.

Results

Analysis of the data from each of the four experiments involved Chi Square tests for association (Winer, 1962). Two related but conceptually distinct questions were asked of each data set. First, were there greater increases in the number of cross-race choices made by experimental students than control? This question measures the amount of cross-racial friendship in the class, which could increase as a result of an increase in total cross-race and within-race choices. Second, were there greater increases in the percentage of cross-race choices out of all choices made by experimental than control students? This question indicates the degree to which race has ceased to be a barrier to friendship, controlling for the number of choices made.

The first question was addressed by means of 2 x 2 contingency tables in Experiments I and III, with factor A (pre-post) and B (TGT vs. Control). The number of cross-race choices were the cell entries. For these experiments only the AB effects were of interest in the analysis. In Experiment II, random assignment at the individual level enabled the calculation of a 3 x 1 Chi Square (TGT vs. TGT without Team Competition vs. Control), where expected frequencies were equal in each cell. Random assignment in Experiment IV permits interpretation of A, B, and AB (interaction) effects for the two experimental factors.

The second question was addressed in a similar fashion, with the addition of a within-race vs. cross-race factor in each analysis. Interest in this case is in an ABC effect in Experiments I and III;

an AB effect in Experiment II; and AC, BC, and ABC effects in Experiment IV (where factor C is within vs. cross-race choice).

The results of the analyses for the four experiments are summarized in Table 3. Chi Squares for both the number and percentage of cross-race choices are presented for each of the six sociometric dimensions. A blank cell in the Table indicates that the specific sociometric variable was not measured in the experiment. Numbers of cross-race choices and percentages of cross-race choices over all choices are presented in Table 4.

Insert Tables 3 and 4 About Here

For Experiment I, significantly positive TGT effects on both the number and percentage of cross-race choices were found for the "helped you" question, but not for "friends in school": for number of choices, $\chi^2_{AB}(1) = 5.95$, $p < .05$; for percentage of choices, $\chi^2_{AB}(1) = 5.07$, $p < .05$. As indicated in Table 3, on this measure TGT students increased from 11 cross-race choices (26% of the total number of choices) to 34 (42%), while control students increased from 33 choices (37%) to 34 (27%), an actual decrease in the percentage of cross-race choices made.

In Experiment II, different effects were obtained for the number and percentages of cross-race choices made. The TGT students chose a significantly higher percentage of opposite race students to same race students on "best friends" ($\chi^2(2) = 7.13$, $p < .05$), and marginally more on "friends outside school" ($\chi^2(2) = 5.31$, $p < .10$) and "who would you like to work with" ($\chi^2(2) = 5.29$, $p < .10$). On the other hand, positive

TGT effects on the number of cross-race choices made were found for "friends in school" ($\chi^2(2) = 14.24$, $p < .01$) and "helped you" ($\chi^2(2) = 11.91$, $p < .01$). In fact, even though there were either number or percentage effects on all five sociometric dimensions, in no case were the number and percentage effects on the same dimension.

In Experiment III, only choices received by blacks were analyzed due to the small number of blacks in the classes. Significantly positive TGT effects were found for number of cross-race "friends in school" ($\chi^2(1) = 16.11$, $p < .01$) and "would work with" ($\chi^2(1) = 7.22$, $p < .01$), and marginal effects were found for "helped you" ($\chi^2(1) = 2.86$, $p < .10$). Marginally positive TGT effects on the percentage of cross-race choices made were found for "friends in school" ($\chi^2(1) = 3.77$, $p < .10$).

Experiment IV, the 2 x 2 (team x game) design, demonstrates consistent team results on the number of cross-race choices made by students. Significant team effects on number of cross-race choices were found for both sociometric dimensions: "friends in school" ($\chi^2(1) = 8.50$, $p < .01$), and "helped you" ($\chi^2(1) = 15.78$, $p < .01$). In addition, a significant effect was found in favor of quizzes over games on the "helped you" dimensions, suggesting a greater frequency of cross-race peer tutoring in the quiz groups than in those in which students played games. No task x reward interactions were found for the number of cross-race choices. Significant team effects on the percentage of cross-race choices were found for "helped you" ($\chi^2(1) = 5.70$, $p < .05$). These results differ slightly from those reported on Experiment IV by DeVries and Edwards (1974). This discrepancy is due to their use of a log-linear Chi Square model. The present analysis uses a simplified model for the sake of

comparability with the other three experiments. No game effects or game x team interactions were found for this measure.

In summary, significantly positive TGT effects on the number of cross-race choices made by students were found in seven of the thirteen instances in which sociometric dimensions were measured across the four experiments. Two marginally significant effects were also found. No effects in favor of the control conditions were found. In the case of the percentage of cross-race over total choices, three of the thirteen comparisons showed significant effects, and three more were marginally significant. Again, no effects were found in favor of the control groups.

Given these results, it is clear that TGT is more effective than control treatments in increasing both the number and percentage of cross-race sociometric choices. TGT effects were obtained about as often for the more intimate friendship questions ("best friends" and "friends outside of school") as for the less intimate friendship dimensions ("friends in school" and "would work with"), or even the entirely task-related sociometric dimension ("helped you"). The present paper reports all four studies in which TGT was conducted in an integrated school; there are thus no schools in which some TGT effect on both the number of cross-race choices and the percentage of cross-race choices failed to be demonstrated. On the other hand, in none of the four schools were number and percentage effects found on all measured variables.

One possible explanation for the lack of positive TGT effects on percentage of cross-race choices in several instances when the effects on number of cross-race choices are highly significant is a ceiling effect. The TGT treatment usually produces a substantial increase in

the total number of sociometric choices made by students. On many of the sociometric dimensions in the four studies reported here, the percentage of cross-race choices approaches (and even occasionally exceeds) the percentage to be expected if race were in no way a basis for sociometric choice. This no-bias expectation is 43% in Experiment I, 52% in Experiment II, 92% in Experiment III, and 49% in Experiment IV. In such cases, increases in the total number of choices would be expected to increase the number of cross-race choices but not the percentage of choices. This explanation is supported by the observation that three of the five cases in which TGT effects were found at the .01 level for number of cross-race choices but not (even at the .05 level) for the percentage of cross-race choices was on the "friends in school" measure. This measure produced the greatest number of nominations by far of all the sociometric measures, and shares with "helped you" the highest cross-racial percentages. On the other hand, the one measure on which there was a significant percentage effect, but no number effect, was "best friends" in Experiment II, the sociometric question that produced the smallest number and percentage of cross-racial nominations across the conditions in that study.

Discussion

The positive effects of TGT on both the number and proportion of cross-racial sociometric choice have major implications for both the theory and practice of classroom techniques designed to desegregate the classroom. The effects on percentages of cross-racial choices indicate that in TGT, race can become less of a criterion for friendship or

helping. On several of the posttest measures, TGT students chose classmates of the opposite race as friends and workmates as often or nearly as often as they would have if race were not a criterion for friendship or helping. On five of the thirteen measures, TGT posttests were within five percentage points of this no-bias expectation, compared to only once for control classes.

The relatively strong and consistent TGT effects on the number of cross-race choices indicate that TGT can increase the amount of cross-race friendship and helping, either as part of a dissolution of race as a barrier to sociometric choice or as part of a general increase in the number of friends and workmates claimed by all students, regardless of race. For practical purposes, the latter finding may be the more important. If nomination on a sociometric measure has any behavioral correlates, an increase in cross-racial choices indicates an increase in the likelihood that black students will have a substantial number of white friends, and vice versa. If misunderstanding and hostility between racial groups are a product of limited communication of friendship between members of different races, then TGT and related team techniques may, by increasing the number of cross-race friendships, contribute to a diminution of racial tensions in schools.

One major implication of the present research is that interracial attitudes (and by inference, behaviors) can be modified by means of a restructuring reward systems in classrooms. In none of the four experiments were teachers aware that race relations were being examined. Thus, there was no direct personal effort to influence racial attitudes. The effects observed can be attributed entirely to the placement of

white students on cooperative teams.

The greatest significance of this research is in its clear message to educators. The results obtained by Aronson et al (1975), by Weigel et al (1975) and by Slavin (Note 1), as well as the present paper, support the use of biracial teams in classrooms to break down racial barriers to friendship and to increase cross-racial friendship and helping. A large body of research on TGT (summarized by DeVries and Slavin, Note 2) has demonstrated effects of TGT on academic achievement as well as attitudinal variables other than racial attitudes. That is, this particular team reward system offers to teachers the opportunity to improve both the academic performance and the cross-racial friendship and helping of their students. Continued research is still necessary to identify parameters, limitations, and modifications of team reward systems. Some unanswered questions include the degree to which the effects maintain over time and across situations, the importance of the percentage of minority students, and examination of the development of group process in the life of the teams. However, the results obtained to date are well enough established to recommend their use in biracial classrooms.

Table 1

Characteristics of Field Experiments

	Experiment I	Experiment II	Experiment III	Experiment IV
Setting:				
1. Geographical Area	Eastern City	Eastern City	Southeastern Suburb	Eastern City
2. Grades	7	7	10-12	7
3. Subject Area	Mathematics	Mathematics Social Studies Science English	Social Studies	Mathematics
4. Study Length	9 weeks	12 weeks	12 weeks	4 weeks
5. Number of Participants	122	128	198	110
6. Percent Black	30%	51%	10%	43%

Table 2

Experimental Designs

	Experiment I	Experiment II	Experiment III	Experiment IV
1. Treatment Groups	TGT, Control	TGT, TGT-NC, Control	TGT, Control	Team vs. Individual, Quiz vs. Game (2 x 2 Factorial)
2. Measurement = Assignment	Class	Student	Class	Student
3. Measurement	Pre-Post	Post	Pre-Post	Post
4. Sociometric Dimensions	Friends in School Helped You	Best Friends Friends out of School Friends in School Would Work With Helped You Friends in School Would Work With	Friends out of School Friends in School Would Work With Helped You Friends in School Would Work With	Friends in School Helped You

Table 3

Chi-Square Values for Tests of Treatment

Effects on Number and Percentage of Cross-Race Choices

Sociometric Dimension	Experiment I	Experiment II	Experiment III (Blacks only)	Experiment IV Teams vs. Individual
Best Friends:				
Number		<1		
Percentage		7.13**		
Friends Outside:				
Number		1.68	<1	
Percentage		5.31*	<1	
Friends in School:				
Number	1.66	14.24***	16.11***	8.50***
Percentage	1.29	1.51	3.77*	2.44
Would work with/ go to for help:				
Number		<1	7.22***	
Percentage		5.29*	2.00	
Helped you:				
Number	5.95**	11.91***	2.86*	15.78***
Percentage	5.07**	2.02	<1	5.70**
	d.f. = 1	d.f. = 2	d.f. = 1	d.f. = 1

* $p < .10$
** $p < .05$
*** $p < .01$

Table 4

Number and Percentage of Cross-Race Choices

Sociometric Dimension	Experiment I				Experiment II			Experiment III (Blacks Only)				Experiment IV			
	TGT		Control		TGT	TGT-NC	Control	TGT		Control		Team		No. Team	
	Pre	Post	Pre	Post				Pre	Post	Pre	Post	Quiz	Game	Quiz	Game
est Friends:															
Number					35	36	30								
Percentage					30%	43%	26%								
riends Outside School:															
Number					91	91	77								
Percentage					42%	48%	36%								
riends in School:															
Number	59	51	77	94	246	177	233	19	69	28	21	59	50	41	29
Percentage	35%	26%	35%	34%	47%	51%	47%	53%	87%	76%	81%	37%	34%	31%	27%
ould Work With/Go to for Help:															
Number					38	32	37	5	27	14	13				
Percentage					34%	48%	32%	33%	79%	61%	72%				
elped You:															
Number	11	34	33	34	83	47	75	3	34	6	14	21	30	4	14
Percentage	26%	42%	37%	27%	50%	51%	44%	43%	81%	86%	74%	34%	54%	20%	29%

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